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Developing the Practical Training Teacher Workforce in Vocational Education Institutions Based on a Competency-Based Approach: Literature Review and Strategic Solutions for Vietnam

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The study uses a competency-based approach (Mulder, 2014) to compare the current state of development of vocational education and training (VET) teachers in Vietnam with six leading countries (USA, Germany, Singapore, China, Japan, Australia) according to four criteria: mandatory national standards, practical business experience, periodic rotation and continuous digital training. Results: Vietnam only achieved 3.0/10 points (lowest), with a double standard achievement rate of < 50%, business experience of 28–32%, rotation of < 10%, and digital training of 15–18% (Tổng cục Giáo dục nghề nghiệp, 2023; Nguyễn, H. L., 2023). Conversely, the six countries achieved 7.75–9.5 points and a student employment rate of 85–99.5% thanks to the synchronised implementation of the four factors above. The study proposes four strategic solutions: (1) double standards + double rotation in the German style; (2) deep enterprise cooperation + national digitalisation platform like Singapore–China; (3) high-intensity CPD like Japan; (4) flexible certification + short-term secondment like the US–Australia. Implementation from 2026 will help Vietnam raise its score to 7+, achieving the goals of the Vocational Education and Training Development Strategy 2021–2030 and supporting smart agriculture and industry.

Keywords: Practical teachers, Vocational education, Competency-based approach, International experience, Dual standards – rotation – Digitalised CPD

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INTRODUCTION

In the context of the Fourth Industrial Revolution and national digital transformation, vocational education and training (VET) is identified as a breakthrough in providing highly skilled human resources to directly meet the needs of the labour market. However, the quality of vocational training in Vietnam still lags significantly behind ASEAN-4 and OECD countries. The core reason is that the teaching staff for practical training does not simultaneously meet "dual standards," possess practical experience in businesses, have regular rotations, and possess digitalisation capabilities (Tổng cục Giáo dục nghề nghiệp, 2023; World Bank, 2022). This situation leads

to an immediate employment rate of VET graduates of only 65–70%, much lower than the 85–99.5% of leading countries (BIBB, 2024; MEXT & JAVADA, 2025; SSG, 2025). Although numerous studies have been conducted on vocational education and training (VET) teachers in Vietnam (Do & Do, 2022; Nguyễn, H. L, 2023). These works mainly focus on surveying the general situation or proposing localised solutions. They have not yet conducted a systematic comparison of the system based on four criteria simultaneously (mandatory national standards – enterprise experience, periodic rotation – digital training) with leading countries worldwide, and especially have not quantified the extent of the difference using a scoring system based on Mulder's competency theory (2014). This study fills that gap, clarifies Vietnam's position, draws selective lessons from international experience, and proposes feasible strategic solutions, contributing to the successful implementation of the VET Development Strategy for the period 2021–2030, with a vision to 2045.

CONCEPT AND THEORETICAL OVERVIEW OF DEVELOPING A TEAM OF PRACTICAL TEACHERS ACCORDING TO THE COMPETENCY APPROACH

According to Mulder (2014), competency is the sum of knowledge, skills, attitudes and the ability to flexibly apply in practical professional situations (Mulder, 2014). Competency-Based Approach is a training method that focuses on developing the knowledge, skills, attitudes and behaviours necessary for individuals, especially practical teachers, to effectively perform professional tasks in a practical context. According to Baumert and Kunter (2011), the competency approach emphasises the achievement of specific outcomes rather than focusing solely on the traditional learning process, ensuring that learners can apply the trained competencies to real-life situations in the workplace (Baumert & Kunter, 2011).

In vocational education (VET), the competency approach is critical because it meets the requirements of training human resources capable of directly meeting the needs of the labor market, especially in the context of international integration and the Industrial Revolution 4.0. Thus, teachers of practice need not only theoretical knowledge but also must be proficient in professional practice skills and be able to connect with the actual working environment in enterprises. Nieke (2011) defines competency in VET as a combination of three main components: professional knowledge (including occupational theory and understanding of new technology), practical skills (the ability to perform specific occupational operations, such as operating machinery or using specialized software), and professional attitudes (including responsibility, discipline, and the ability to adapt to changing labor market requirements) (Nieke, 2011). Competency-based approaches require that practice teachers be able to integrate these components into the teaching process, ensuring that learners acquire vocational skills that are close to practical requirements. According to Cedefop (2016), competency-based approaches in vocational education are characterized by the following elements: (i) Outcome-oriented: Training programs are designed based on specific competency standards, determined by labor market needs and industry standards (Cedefop, 2016, p. 12); (ii) Flexibility: Teachers need to adjust teaching content and methods to suit changing requirements; (iii) Collaboration with businesses: Practice teachers must work closely with businesses to ensure that training content accurately reflects the skills required in the workplace (Cedefop, 2016, p. 15) (iv) Competency-based assessment: Student learning outcomes and teacher competence are assessed through practical criteria, such as the ability to perform professional tasks or produce products that meet corporate standards.

In the context of Vietnam,tThe competency approach not only helps teachers meet teaching requirements but also contributes to improving the quality of vocational training, ensuring that graduates can work immediately in a real environment. According to the Vocational Education Development Strategy for the 2021-2030 period, a competency-based approach is one of the key orientations to bring Vietnam's vocational education closer to ASEAN-4 countries, through improving the capacity of practical teachers (Chính phủ Việt Nam, 2021).

MODELS OF PRACTICAL TEACHER DEVELOPMENT IN VOCATIONAL EDUCATION IN SEVERAL COUNTRIES

In this study, we selected models of practical teacher development in six countries: the United States, Germany, Singapore, China, Japan, and Australia, based on the leading positions of each country: the United States (NBPTS) and Australia (TAFE, ASQA) represent a competency-based approach; Germany (BIBB) exemplifies the enterprise-school Duales System model; Singapore (ITE) excels in high-quality practical teacher training; and China and Japan demonstrate rapid, large-scale development closely linked to national industrialization strategies. These models provide diverse experiences suitable for comparison and proposing solutions for vocational education in Vietnam.

United States

Career and Technical Education (CTE) in the United States is a system of practical skills training designed to prepare the workforce for employment (Advance CTE., 2023; U.S. Department of Education, 2023), primarily implemented in comprehensive high schools, regional vocational schools, and full-time vocational schools (NCES, 2022). The Perkins Act V (2018) mandates academic-vocational integration and increased business involvement (U.S. Department of Education, 2023). 96.6% of high school graduates participate in at least one CTE program; approximately 30% of vocational certificates are awarded by two-year community colleges (NCES, 2022; U.S. Department of Education, 2023). Teachers teaching practical skills must possess a State CTE Teaching License issued by each state according to the national framework. This vocational certification requires: (i) a bachelor's degree or higher in a relevant field; (ii) ≥ 2 years of practical industry experience (some states require 3–5 years);

(iii) completion of a teacher training program with practical experience; and (iv) passing a competency test (usually PRAXIS). Alternative certification pathways are widely used (e.g., California: CBEST + 3 years of experience) (BLS, 2024; California Commission on Teacher Credentialing, 2023; Education Commission of the States, 2022). This certification is valid for 5 years and can be renewed with 150 CPD hours (≥ 40 industry-related hours). Simultaneously, two other mandatory requirements under Perkins V must be met: (i) Teacher Externships/Industry Rotation: 40–80 hours/year (5–10 days) of internship at companies (Boeing, GE, etc.), helping teachers design more practical lessons, thereby increasing student employment rates by 15–20% and reducing teacher turnover by 30% (Advance CTE, 2023; RAND, 2023); (ii) Digital Continuing Professional Development (CPD): ≥ 40 hours/year via NCCER Digital Campus (free, Canvas LMS), focusing on Industry 4.0 (BIM Revit, AR Welding, AI Predictive Maintenance).

Germany

The German vocational education system (Duales System) is recognised as a global standard model, combining theoretical training at public vocational schools (Berufsschule) and practical training at businesses, accounting for 60–70% of the time (BIBB, 2024). Programs last 2–3.5 years, students sign employment contracts, receive salaries, and enjoy full labour rights. The employment rate after graduation exceeds 90%, and youth unemployment is below 7%. Practical instructors (Ausbilder) are required to have an Ausbildereignungsprüfung (AEVO) certificate – a national legal requirement. Conditions for obtaining the certificate: (i) a higher vocational qualification (Meisterbrief/Techniker/Fachwirt or equivalent); (ii) completion of 120 hours of pedagogical training; (iii) passing both the theoretical and practical examinations. The certificate is valid for 5 years, renewable with a minimum of 40 hours of CPD (BIBB, 2024). Two other mandatory mechanisms to maintain high practical relevance are: Praxisphasen: Berufsschule instructors must spend ≥ 4 weeks/year (20 working days) on internships at partner companies (Siemens, Bosch, Volkswagen, etc.). This mechanism increases the quality of practical instruction by 25% and reduces the theory-practice gap (Springer, 2023).

Digitalised CPD: ≥ 24 hours/year through BIBB Academy and over 320 VR/AR centres (DigitalPakt Schule & VET 4.0, €5 billion investment). Focus areas: VR Welding (40% accident reduction), AR Assembly Line, Digital Twin, and sustainable manufacturing. Completion rate reaches 98%, with 80% of teachers integrating VR/AR into their teaching (BIBB, 2025; ScienceDirect, 2024). Thanks to the rigorous AEVO certification system, regular teacher rotation to businesses, and mandatory digitalised CPD.

Singapore

Vocational education and training (VET) in Singapore is considered a strategic pillar in meeting the demands of the digital economy and Industry 4.0, primarily implemented through the Institute of Technical Education (ITE) and five public polytechnics. ITE accepts approximately 25% of post-secondary students, providing NITEC/Higher NITEC certificates with 70% practical training; polytechnics offer specialised diplomas. The Earn & Learn Programme initiative collaborates with over 1,000 businesses, allowing students to work while studying and earn a salary. As a result, 90–92% of students find full-time employment within six months of graduation, with unemployment rates below 2% (SSG, 2025). Practical instructors are required to hold a Certificate IV in Training and Assessment (TAE40122 – Cert IV TAE) as mandated by SkillsFuture Singapore (SSG). This certification requires: (i) a Diploma or higher in a relevant field; (ii) ≥ 100 hours of supervised teaching practice; (iii) passing the assessment of 10 core competency units within the WSQ framework. The certification is valid for 3 years and is renewable upon completion of ≥ 60 hours of CPD (ITE; SSG, 2023). Additionally, two other mandatory mechanisms must be completed: (i) Industry Attachment Programme (IAP): 6–12 weeks/year (30–60 days) of work experience at a large company (Grab, DBS, ST Engineering, SingHealth…). In practice, after the IAP, > 30% of the course content is updated, contributing to a 90–92% employment rate for graduates (ITE, 2023; SEA-VET, 2024). (ii) Continuous Digital Development (CPD) with ≥ 100 hours/year via Canvas LMS + Zappar AR, > 3,500 micro-courses, each teacher receives S$500/year to choose courses from SSG-accredited providers such as ITE's Centre for Digital Pedagogy or MySkillsFuture portal (SkillsFuture Singapore, 2024). Focus areas: AR Aircraft Maintenance, AI Chatbot, IoT Smart Factory, Metaverse Classroom. Completion rate in 2025 reached 96% (SSG, 2024, 2025). Thanks to a rigorous certification system, long-term rotation, and strong digital CPD, VET teachers in Singapore consistently maintain up-to-date expertise and digitised pedagogical skills, affirming their leading regional position in training-employment linkage (SkillsFuture Singapore, 2023).

China

China considers technical and vocational education and training (TVET) as a key driver supporting industrialisation and "Made in China 2025". Since 2019, the "50% theory – 50% practical training at enterprises" model has been implemented nationwide (World Bank, 2023). The popular "1+1+1" training model combines learning at school and paid work at enterprises. Result: the employment rate of graduates six months after graduation is > 97% (MOE China, 2024). According to the 2022 Vocational Education Law, practical teachers are required to have a Double-Qualified Teacher Certificate (双师型教师证书). This certificate requires: (i) a high-level vocational degree/certificate (national level 4–5); (ii) 240–360 hours of specialised pedagogical training; (iii) ≥ 3 years of practical experience in a company. The certificate is valid for 5 years and can be renewed upon completion of ≥ 72 hours of CPD (NPC, 2022). By 2025, over 65% of TVET instructors had achieved "dual" certification (MOE, 2024). Simultaneously, they must comply with two mandatory mechanisms: (i) Practical training at a company (企业实践): ≥ 2 months/year (60 days) at large corporations (Huawei, BYD, CRRC, Haier, Foxconn). By 2024, > 85% of instructors had completed this (MOE China, 2024); (ii) Continuous Digital Development (CPD): ≥60 hours/year via the National Smart Education Platform (launched in 2022), connecting 519,000 institutions, >200 virtual simulation courses. Focus areas: 3D Printing, 5G Robotics, AI Quality Control, VR Safety Training. Completion

ate by 2025 is projected to reach 90%, with 85% of teachers achieving digital certification (MOE China, 2025). Thanks to the "dual teacher" system, long-term rotation of employment at enterprises, and the national digital CPD platform, Chinese TVET maintains a team of teachers who are always up-to-date with the latest technologies, ensuring a highly skilled workforce for digital transformation and smart manufacturing (MOE China, 2024; Springer, 2022).

Japan

The vocational education and training (VET) system in Japan is mainly implemented through senmon gakko (2–4 years) and kosen (5 years), focusing on equipping students with practical skills so they can work immediately after graduation (MEXT, 2024). The program is designed on the principle of "theory serving practice" with ≥ 80% of the time dedicated to practical training in modern workshops or businesses. Practical instructors are required to have ≥ 5 years of experience at large corporations (Toyota, Sony, Panasonic, etc.) and impart Kaizen thinking, 5S methods, workplace safety, and Japanese-style teamwork culture (JILPT, 2023). Results: 99.5% of kosen students and > 97% of senmon gakko students are employed immediately upon graduation – the highest rate in the world (JILPT, 2023; MEXT, 2024). Teachers must possess a Special Teaching Permit – Tokubetsu Menkyo – issued by MEXT specifically for VET. This teaching permit requires: (i) a senior vocational certificate; (ii) ≥ 5 years of business experience; (iii) 60 hours of specialised pedagogical training. This permit is valid for 10 years, renewable through CPD. They must also comply with two other mandatory mechanisms: (i) Work rotation to a company (kigyō haken): ≥ 1 month/year (20–25 days) at Toyota, Fanuc, Hitachi, etc., to operate robots, IoT, 5G, and smart factories. By 2024, > 95% of teachers will have updated their knowledge to Industry 4.0 and Society. 5.0 (MEXT, 2024); ii) Digital Continuing Professional Development (CPD): ≥ 240 hours/year (highest in the world) via JAVADA LMS and FANUC ROBOGUIDE. Key content: 6-axis robot programming, CAD/CAM Fusion 360, IoT Kaizen, AI Vision System. Completion rate in 2025 will reach 99%, shortening training time for students by up to 25%, while maintaining a near 100% employment rate for VET students – the highest in the world (MEXT & JAVADA, 2025). Thanks to Tokubetsu Menkyo, regular rotations, and intensive digitalisation of CPD, Japanese VET teachers are always at the forefront of bringing the latest technology from the factory into the classroom, playing a crucial role in making Japan a global model for digital vocational training.

Australia

In Australia, the Vocational Education and Training (VET) system focuses on training a skilled workforce ready for immediate employment, with at least 70% of the time dedicated to workplace-based training through apprenticeships, paid internships, or modern workshop simulations. Programs from Certificate III to Advanced Diploma are offered at public TAFE institutions and registered training organisations (RTOs). Businesses participate in program design and competency assessment according to the national Training Packages. Results: >86% of graduates find full-time employment or continue their studies within 6 months of graduation – among the highest in the world (ASQA, 2023; NCVER, 2024). Trainers and assessors are required to hold TAE40122 – Certificate IV in Training and Assessment. This certification requires: (i) a Diploma or higher in a relevant field; (ii) ≥ 100 hours of supervised teaching practice; (iii) passing an assessment of 10 core competency units. The certification is valid for 5 years, renewable via CPD, and must be updated when national standards change (ASQA, 2023; training.gov.au, 2024). Simultaneously, two other mandatory mechanisms must be followed: (i) Industry Secondment: 4–6 weeks/year (20–30 days) of on-site work experience at companies such as BHP, Siemens, Qantas, etc., to gain experience in automation, industrial robotics, renewable energy, green skills, and to bring that experience back to redesign lectures to meet current recruitment needs (TAFE Directors Australia, 2023); (ii) Continuing Digital Professional Development (CPD): ≥ 35 hours/year via the VET Moodle Network (connecting > 320 RTOs). Key content areas:

IoT Smart Manufacturing, AI Assessment Tools, VR Safety Induction, BIM for Construction. Completion rate by 2025 is projected at 94% (ASQA, 2025). Thanks to a unified certification system, regular rotation of teachers working in businesses, and a national digital CPD platform, Australian VET teachers maintain continuously updated expertise and practical skills, ensuring a high level of alignment between training and the labour market (NCVER, 2024).

Analysis results show that teachers teaching practical skills in vocational education in six leading countries worldwide (USA, Germany, Singapore, China, Japan, Australia) must simultaneously meet four mandatory requirements: (i) Combined professional teaching certification (AEVO – Germany, Cert IV TAE – Australia & Singapore, Double-Qualified Teacher – China, Tokubetsu Menkyo – Japan, State CTE License – USA); (ii) Practical experience at a company before teaching (minimum 2–5 years); (iii) Regular rotations to companies (20–60 days/year, highest in Singapore and China); (iv) Mandatory continuous digital development (CPD) training (24–240 hours/year, highest in Japan). These requirements ensure that teachers are always up-to-date with Industry 4.0 technologies (VR/AR welding, Digital Twin, AI assessment, IoT manufacturing) and maintain the practical relevance of their lectures. As a result, the post-graduation employment rate of students ranges from 85–99.5%, with Japan achieving 97–99.5% (MEXT, 2024), China > 97% (MOE China, 2025).

Simultaneously, the study indicates that the intensity of teacher mobility to enterprise work and digital continuous professional development (CPD) has a clear positive correlation with student employability (Advance CTE, 2023; RAND, 2023; Springer, 2023).

CURRENT STATUS OF THE DEVELOPMENT OF PRACTICAL EDUCATION TEACHERS IN VOCATIONAL EDUCATION IN VIETNAM

During the period 2016-2018, the number of vocational education teachers increased significantly in all types of vocational education institutions, with the strongest increase in 2017 due to the merger of colleges and vocational secondary schools into the vocational education system and the rapid increase in enrollment and training (reaching approximately 2.2 million people per year), requiring vocational education institutions to recruit additional and new teachers. However, in implementing Resolution No. 19-NQ/TW dated October 25, 2017, of the Central Committee of the 12th Party Congress on Continuing to reform the organisational and management system, improving the quality and efficiency of public non-business units, ministries, sectors, and localities have reviewed and reorganised to reduce the number of public vocational education institutions under their management. Therefore, the number of vocational education and training (VET) institutions decreased from 1,306 (2017) to 1,216 (2021), leading to a decrease in the number of VET teachers from 86,910 (2018) to 81,900 (2021) (Table 1).

Quality

Mulder's theory emphasises that VET (Vocational Education and Training) teacher competence must support the bridge between education and labour, with core elements such as practical experience, rotation, and training to develop comprehensive competencies. If a country integrates these three approaches well, it will lead to high-quality VET. Based on this, we assess the current state of development of practical education teachers in Vietnam's vocational education and training according to the following four criteria:

+ Mandatory national standards: Circular 04/2021/TT-BLDTBXH stipulates that practical education teachers must have a national vocational skills certificate at the appropriate level and a pedagogical certificate. However, by 2023, only about 38–42% of teachers met this standard (Tổng cục Giáo dục nghề nghiệp, 2023). Many teachers still use old certificates or have not been assessed according to the National Vocational Competency Framework (NVQF). According to research by (Nguyễn, H. L, 2023), 100% of vocational education teachers (including teachers and

Table 1. VET teaching staff by VET institution, 2017-2021

(Unit: Persons)

Year	Total	*Including*			
		College	Vocational School	Vocational Training Centre	Other institutions with vocational training activities
2016	67.650	19.711	9.905	16.028	21.862
2017	86.350	37.826	18.198	15.481	14.864
2018	86.910	37.086	18.328	15.571	14.925
2019	84.302	37.633	14.727	20.344	11.598
2020	83.959	37.235	13.295	23.086	10.343
2021	81.900	35.361	12.713	22.959	10.867

Source: Project on building and developing the team of vocational education teachers and management staff for the period 2024-2035; Vocational education teachers include: management staff and teachers in vocational education institutions.

administrators) meet the training qualification standards. Approximately 70% of vocational education teachers meet the vocational skills standards to teach practical skills at all levels, of which about 50% of teachers in secondary and college-level schools can teach integrated (theory combined with practice). Thus, there is still a segment that does not meet the vocational skills standards to teach practical skills and integrated (teaching both theory and practice), even though they have met the training qualification standards. The main reason is the change in vocational education teacher standards, especially the vocational skills standards, after the unified state management of vocational education was transferred to the Ministry of Labour, Invalids and Social Affairs (Nguyễn, H. L, 2023). This has led to a situation where several teachers in vocational colleges and secondary schools, while meeting the teacher standards of the Ministry of Education and Training, are considered to have not yet met the standards stipulated in the Law on Vocational Education (2014, amended 2019), especially in some specialized fields; there is also a lack of many vocational skills training programs for vocational education teahers, as well as examination papers for organizing assessments and issuing vocational skills certificates to teachers (Nguyễn, H. L, 2023).

+ Practical experience in enterprises: According to Do and Do (2022), the percentage of teachers teaching practical skills with at least 2 years of practical experience in enterprises only reaches 28–32%. The main reason is the recruitment mechanism that prioritizes academic qualifications over practical experience and the lack of policies to encourage enterprises to accept teachers for internships (World Bank, 2022). In addition, due to work pressure and low salaries and benefits for teachers, it has not attracted highly qualified professionals, especially those with high vocational skills, to participate in teaching at all levels of vocational education; there is also no mechanism to encourage enterprises and attract highly skilled workers in enterprises to participate in training at all levels in the field of vocational education.

+ Periodic rotation to businesses: The 2014 Vocational Education Law (amended and supplemented in 2019) and the 2021–2030 Vocational Education Development Strategy stipulate that teachers must be rotated periodically to businesses, but this has not been effectively implemented to date. Reports show that less than 10% of vocational education institutions have been able to implement this form of rotation due to a lack of funding, a lack of coordination mechanisms, and mandatory sanctions (Tổng cục Giáo dục nghề nghiệp, 2023).

+ Continuous digitalization training: The digital transformation program for vocational education and training until 2025, with a 2030 orientation (Decision 2222/QD-TTg), requires teachers to receive regular digital skills training, but in reality, only 15-18% of practical teachers are trained in online teaching, virtual simulation, AI, and Industry 4.0 technologies (Tổng cục Giáo dục nghề nghiệp, 2023). Digital infrastructure at vocational education and training institutions is still weak, training programs lack mandatory time slots, and there is a lack of synchronisation between localities (Vu & Nguyen, 2023).

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COMPARISON OF THE CURRENT STATE OF DEVELOPMENT OF PRACTICAL TRAINING INSTRUCTORS IN VOCATIONAL EDUCATION IN VIETNAM WITH SIX COUNTRIES (USA, GERMANY, SINGAPORE, CHINA, JAPAN, AUSTRALIA)

Vocational education and training (VET) plays a key role in forming a highly skilled workforce, especially the practical training instructors – those who directly impart practical skills, bridging the gap between theory and production application. In the context of the Fourth Industrial Revolution and digital transformation, developing this workforce requires synchronization between standardization, practical experience, rotation, and digital training. To determine the current state of practical training (VET) teacher development in Vietnam's vocational education system, identify existing problems, and draw lessons from international experiences to improve the system, we conducted a comparative analysis of the current state of VET teacher development in Vietnam with six other countries (USA, Germany, Singapore, China, Japan, and Australia) based on four criteria (mandatory national standards; practical experience in enterprises; regular rotation to enterprises; and digital continuous professional development) using secondary data updated to 2025. The comparison was made using a scoring system of 1-10 points (1: very weak; 10: excellent), based on the level of mandatory requirements, implementation, and impact on VET quality.

The scores are determined based on Mulder's (2014) theory of professional competence of VET teachers, as presented in the chapter "Conceptions of professional competence" of the International Handbook of Research in Professional and Practice-based Learning (Mulder, 2014). This theory defines VET teacher competence as an integration of knowledge, skills, attitudes, and values, with three main approaches: Functional behaviourism: Emphasizes specific, measurable behaviors (related to mandatory national standards and practical experience); Integrated occupationalism: Focuses on combining theory with business practice (related to regular rotation); Situated professionalism: Emphasizes continuous learning and adaptation to socio-economic contexts, including digitalization (related to ongoing digitalization training).

Mulder's theory emphasises that VET teacher competence must support the bridge between education and work, with core elements such as practical experience, rotation, and training to develop comprehensive competencies. Higher scores are achieved if a country integrates these three approaches well, leading to high-quality VET (e.g., graduate employment rate >85%, reduced theory-practice gap). Mulder (2014) argues that "professional competence in VET requires ongoing industry engagement and digital adaptation to bridge the gap between education and work" (Mulder, 2014, pp. 107-137). Applying this theory to evaluate each criterion ensures that the scores reflect the level of alignment with the comprehensive competency model. The scoring process is as follows:

Step 1: Data Collection: Based on key indicators from reputable sources, such as the percentage of qualified teachers (% meeting standards, certificate validity period), mandatory requirements (national legal requirements), implementation rate (% completion of rotation/training), and impact (training employment rate, reduction of the theory-practice gap). For example, Criterion 1 (mandatory standards) is assessed based on the percentage meeting standards and legal requirements; Criterion 4 (digitalisation training) is based on mandatory hours/year and percentage completion.

Step 2: Classification by Level:

1-3: Weak (not mandatory, implementation rate < 30%, low impact); 4-6: Medium (mandatory but implementation rate 30-60%, medium impact); 7-10: Strong (mandatory, implementation > 70%, high impact, such as increased employment > 15%).

Step 3: Averaging: The score for each criterion is a weighted average (50% based on implementation, 30% on impact, 20% on legal obligation). The total score is the average of the four criteria, reflecting the degree of integration of Mulder's (2014) three approaches. The scoring results are presented in Table 2.

A comparative analysis of the current state of development of practical teachers in vocational education and training in Vietnam with 6 countries (Table 2), according to each criterion, shows:

(1) Compulsory national standards: This criterion assesses the unified legal framework and the percentage of teachers meeting the standards, ensuring basic pedagogical and professional competence. Vietnam stipulates through Circular 04/2021/TT-BLDTBXH, requiring vocational skills and pedagogical professional certificates, but only 38-42% of practical teachers meet the standards (Tổng cục Giáo dục nghề nghiệp, 2023). About 70% meet vocational skills standards, but 50% only teach integrated subjects, lacking assessment according to the National Competency Framework (Nguyễn, H. L, 2023). The reason is the transfer of management to the Ministry of Labour, Invalids and Social Affairs, leading to the old certificates not conforming to the Vocational Education and Training Law (2014, amended 2019). Vietnam's score is significantly lower (4/10 points), while Germany leads with its mandatory AEVO (advanced vocational qualification + 120 hours of teaching; valid for 5 years, BIBB, 2024). The US is more flexible with the State CTE License (bachelor's degree + ≥ 2 years of experience; 96.6% of students participate, NCES, 2022). Singapore (Cert IV TAE, 90-92% employment, SSG, 2025), China (Double-Qualified, 65% achieved by 2025, MOE China, 2024), Japan (Tokubetsu Menkyo, 97% employment, MEXT, 2024) and Australia (TAE40122, 86% employment, ASQA, 2023) all have strict national standards and high achievement rates (80-98%). Vietnam is weak in implementation and consistency; it needs to learn from the experiences of Germany (strict dual standards) and the US (flexible alternative roadmap).

(2) Practical experience at enterprises: The criterion emphasizes the requirement of industry experience to ensure practicality. Only 28-32% of teachers in Vietnam have ≥ 2 years of experience (Do & Do, 2022), due to prioritising

Table 2. Comparison of the current state of development of practical teaching staff in vocational education in Vietnam with six countries (USA, Germany, Singapore, China, Japan, Australia)

Country	National Mandatory Standards (*certification/ legal requirements*)	Practical Industry Experience (*minimum required years*)	Periodic Enterprise Secondment (*mandatory duration/year, implementation*)	Digitalised Continuous Professional Development (*hours/year, completion rate*)	Average Score
Vietnam	4 — Circular 04/2021; only 38–42% meet standards	3 — Only 28–32% have ≥ 2 years of experience	2 — < 10% implemented; insufficient funding	3 — 15–18% trained; weak digital infrastructure	**3.00**
United States	8 — State CTE License; flexible; 96.6% student participation	8 — ≥ 2 years required; raises student employment by 15–20%	8 — 40–80 hours/year; reduces teacher turnover by 30%	7 — ≥ 40 hours/year; 78% completion; 85–90% employment	**7.75**
Germany	10 — AEVO mandatory; 90% employment post-graduation	10 — Meisterbrief; reduces theory–practice gap by 25%	9 — ≥4 weeks/year; improves teaching quality by 25%	9 — ≥ 24 hours/ year; 98% completion; 80% VR/AR integration	**9.50**
Singapore	9 — Cert IV TAE; 90–92% employment	8 — Diploma + practicum; updates 30% of course content	9 — 6–12 weeks/ year; increases employment to 90–92%	9 — ≥ 100 hours/ year; 96% completion	**8.75**
China	8 — Double-Qualified; 65% to meet standards by 2025	8 — ≥ 3 years; >97% graduate employment	8 — ≥2 months/ year; >85% completion	8 — ≥ 60 hours/ year; 90% completion	**8.00**
Japan	9 — Tokubetsu Menkyo; 97% employment	9 — ≥ 5 years; 99.5% employment	8 — ≥ 1 month/ year; Industry 4.0 alignment	10 — ≥ 240 hours/ year; 99% completion; shortens training time by 25%	**9.00**
Australia	9 — TAE40122; 86% employment	9 — Diploma + supervision; strong labor market alignment	8 — 4–6 weeks/ year; industry-aligned curriculum design	8 — ≥ 35 hours/ year; 94% completion	**8.50**

academic degrees and lack of encouragement from businesses (World Bank, 2022). Low remuneration reduces the attraction of experts (Nguyễn, H. L, 2023). Vietnam's assessment score is last (3 points), far behind Germany (Meisterbrief, 25% reduction in the theory-practice gap, Springer, 2023) and Japan (≥ 5 years at Toyota/Sony, 99.5% employment, MEXT, 2024). The US (≥ 2 years, 15-20% increase in trainee employment, Advance CTE, 2023), Singapore (Diploma + internship, 30% lecture updates, ITE, 2023), China (≥ 3 years, > 97% employment, MOE China, 2024), and Australia (Diploma + supervision, NCVER, 2024) all mandate and support these programs, achieving 80-95% employment rates. Vietnam is still limited in attracting experts, so it needs to supplement incentive mechanisms similar to Singapore (business cooperation) and China (dual certification).

(3) Periodic rotation to enterprises: Criteria for evaluating the mechanism of periodic practice updates. Vietnam stipulates this through the Vocational Education and Training Law (2014, amended 2019) and the Vocational Education and Training Development Strategy 2021-2030, but < 10% is implemented due to lack of funding, coordination and sanctions (Tổng cục Giáo dục nghề nghiệp, 2023).

Vietnam's evaluation score is the weakest (2 points), while Singapore leads (6-12 weeks/year at Grab/ST Engineering, raising 90-92% of jobs, SSG, 2025). Germany (≥ 4 weeks/year at Siemens/Bosch, 25% increase in lecture quality, BIBB, 2024), China (≥ 2 months/year at Huawei, >85% completion, MOE China, 2024), Japan (≥ 1 month/year at Fanuc, Society 5.0 update, MEXT, 2024), the US (40-80 hours/year, 30% reduction in job turnover, RAND, 2023) and Australia (4-6 weeks/year at BHP, TAFE Directors Australia, 2023) are all mandatory, with a completion rate of 85-95%. Vietnam lacks an implementation mechanism; it needs to learn from Singapore (long duration, financial support) and Germany (strategic business partner).

(4) Continuous digitalisation training: This criterion focuses on continuous training in digital technology. Vietnam mandated training through Decision 2222/QD-TTg, but only 15-18% of teachers received training (Tổng cục Giáo dục nghề nghiệp, 2023) due to weak infrastructure and a lack of mandatory training hours (Vu & Nguyen, 2023). Vietnam's assessment score was low (3 points), lagging behind Japan (≥ 240 hours/year via JAVADA, 99% completion, 25% training shortened, MEXT & JAVADA, 2025), Germany (≥ 24 hours/year, 98% completion, 80% VR/AR integration, BIBB, 2025), Singapore (≥ 100 hours/year via Canvas, 96% completion, SSG, 2024), China (≥ 60 hours/year via National Platform, 90% completion, MOE China, 2025), and Australia (≥ 35 hours/year via VET Moodle). 94% completion (ASQA, 2025) and the US (≥ 40 hours/year via NCCER, 78% completion, NCCER, 2025) both have national platforms with Industry 4.0 content. Vietnam is slow to adapt to digitalisation; it needs to supplement its national digitalisation platform, like China and Singapore (free micro-courses).

Vietnam's average score across the four criteria is 3.0/10 points, indicating that Vietnam ranks low in the development of practical teaching staff in vocational education and training compared to six other countries (US: 7.75; China: 8.0; Australia: 8.5; Singapore: 8.75; Japan: 9.0; Germany: 9.5). The main reasons are weak implementation (standard compliance rate < 50%, rotation < 10%) and lack of support mechanisms (funding, coordination).

From the comparative analysis results, four issues can be identified. Improvements needed in the development of practical teaching staff in Vietnam's vocational education and training include: (i) Increasing the dual qualification rate to 70% by 2030 through NVQF assessment; (ii) Encouraging business experience through support funds; (iii) Establishing a mandatory system of periodic rotation to businesses (≥ 1 month/year); (iv) Investing in digital infrastructure and a CPD framework of ≥ 40 hours/year.

Lessons Learned for Vietnam

In the context of Vietnam's implementation of the Vocational Education and Training Development Strategy for the period 2021-2030, learning from the experiences of countries with advanced vocational education and training systems is necessary to overcome current limitations, such as the low percentage of qualified teachers (38-42%), limited practical experience (28-32%), weak enterprise rotation (< 10%), and ineffective digital training (15-18%)

(Nguyễn, H. L, 2023). Based on comparative analysis, Vietnam can draw specific lessons from six countries (USA, Germany, Singapore, China, Japan, Australia), focusing on four criteria: mandatory national standards, practical experience in enterprises, regular rotation to enterprises, and continuous digital training. Applying these lessons not only raises the overall assessment score from 3.0 to 7+, but also contributes to achieving national strategic goals, increasing the employment rate of trainees to 80-90%, and supporting the development of smart agriculture and industry.

(1) Lessons from Germany: Building a Strict National Standard (AEVO) and Dual Rotation to Ensure High Practicality. Germany is a model example with a dual system, where practical teachers must obtain a mandatory AEVO certificate, including a high-level vocational qualification (Meisterbrief), 120 hours of pedagogical training, and a theory-practice exam (BIBB, 2024). The certificate is valid for 5 years, renewable through 40 hours of CPD, ensuring a standard achievement rate of > 95% and a trainee employment rate of > 90% (BMBF, 2024). The important lesson is the strictness of national legal regulations, combined with regular rotations of ≥ 4 weeks/year at companies (Siemens, Bosch), which helps increase the quality of lectures by 25% and reduce the gap between theory and practice (Springer, 2023).

For Vietnam, it is necessary to learn from this by amending Circular 04/2021/TT-BLDTBXH to integrate "dual standards" (pedagogy + advanced vocational skills), mandating assessment according to the National Vocational Competency Framework (NVQF) for all practical teachers. Simultaneously, a mechanism for mandatory periodic rotation to businesses for at least 4 weeks/year should be established, supported by state funds and business partners (similar to the current cooperation with GIZ), aiming to raise the compliance rate to 70% by 2030. This will address the situation where only 50% of teachers teach integrated subjects (Nguyễn, H. L, 2023), increasing practicality and supporting smart agriculture through IoT and automation skills.

(2) Lessons from Singapore and China: Strengthening cooperation with businesses and building large-scale digital platforms. Singapore and China stand out with close business cooperation and national digital platforms. In Singapore, the Cert IV TAE certificate requires a Diploma + 100 hours of internship, combined with an Industry Attachment program (6-12 weeks/year at Grab, ST Engineering), updating 30% of lectures and raising the student employment rate to 90-92% (ITE, 2023; SSG, 2025). China applies "Double-Qualified" (≥ 3 years of practical experience at a business), rotation ≥ 2 months/year at Huawei, with > 85% completion (MOE China, 2024). Both countries have large-scale digital CPD: Singapore ≥ 100 hours/year through Canvas LMS (96% completion); China aims for ≥ 60 hours/year of training through the National Smart Education Platform (90% completed, MOE China, 2025), focusing on AI and IoT.

The lesson for Vietnam is to develop cooperation with businesses through the "Earn & Learn" model (Singapore) or "1+1+1" (China), integrating it into the Vocational Education Law to mandate business participation in program design and periodic rotation of training to businesses. Simultaneously, build a national digital platform (similar to Decision 2222/QD-TTg), providing free micro-courses on Industry 4.0, aiming to increase the rate of digital training from 15-18% to 80%. This will overcome weak infrastructure and lack of coordination (Vu & Nguyen, 2023), supporting teachers in teaching practical applications of digital technology in agriculture and industry.

(3) Lessons from Japan: Increase high CPD intensity to adapt to Industry 4.0. Japan leads with CPD intensity ≥ 240 hours/year through JAVADA LMS and FANUC ROBOGUIDE, achieving 99% completion, helping to shorten trainee training time by 25% and employment rate close to 100% (MEXT & JAVADA, 2025). The Tokubetsu Menkyo certificate requires ≥ 5 years of experience at Toyota/Sony, combined with periodic rotation to the enterprise ≥1 month/year to update kaizen, 5S and Society 5.0 (JILPT, 2023; MEXT, 2024).

Vietnam needs to learn by raising the CPD framework from encouragement to mandatory ≥100 hours/year, focusing on Industry 4.0 (IoT, robotics), with a national LMS platform to monitor progress. Combining practical experience at enterprises with ≥ 5 years in recruitment, such as senmon gakko, to overcome low remuneration and

lack of high-level vocational skills (Do & Do, 2022). This lesson will support the goal of digital transformation, increasing smart agricultural productivity through highly skilled teachers.

(4) Lessons from the US and Australia: Flexible Certification Pathways and Short-term Industry Secondment to increase implementation. In Vietnam today: To be a vocational education practical teacher, one must have a bachelor's degree in pedagogy + a national vocational skills certificate. If someone is currently working in an enterprise (engineer, expert with 10-15 years of experience) and wants to switch to teaching vocational skills, there is almost no legal way in, due to the lack of a pedagogical degree or vocational teaching certificate. Results: Very few business professionals transfer to teaching positions, therefore only 28-32% of practical teachers have actual business experience. The US and Australia have addressed this issue with various flexible alternative routes (recognition of prior learning – RPL), specifically: In the US, to become a practical teacher in vocational education, one must have: a State CTE License (only ≥ 2-3 years of industry experience + passing the PRAXIS exam); Alternative Certification (e.g., California: only CBEST + 3 years of experience + a 6-12 month pedagogical training course); Industry Credential + 0 teaching certificate is still allowed if you have 5-7 years of experience. Results: > 45% of new CTE teachers come from businesses (BLS, 2024). Digitalized CPD ≥ 40 hours/year through NCCER. Results: 78% completed. In Australia: Using TAE40122 (Diploma + 100 hours of internship), 4-6 weeks/year secondment at BHP, and labour market integration (ASQA, 2023; TAFE Directors Australia, 2023). Digitalized CPD ≥40 hours/year via VET Moodle. Results: 94% completion. TAE40122 with RPL (recognition of prior work experience in lieu of a portion of theoretical learning); Skill Set TAE (only 4-6 competency units, no need for a full Certificate IV); Enterprise RTO (businesses train and certify their own experts internally to teach). Results: 52% of trainers/assessors have RPL from industry experience (NCVER, 2024). Thanks to flexible pathways, the US and Australia have attracted tens of thousands of skilled engineers and technicians from companies like Boeing, General Electric, BHP, and Qantas to provide vocational training within 6-12 months of transition, instead of requiring them to complete 4-5 years of teacher training at university.

Furthermore, breaking down the periodic "rotation" period to businesses into smaller segments is a lesson learned from the experiences of the US and Australia. In Vietnam, the Vocational Education Law (2014) stipulates "periodic rotation to businesses," but lacks funding and a specific schedule. As a result, less than 10% of teachers actually participate. Meanwhile, the US and Australia transformed "rotation" into "short-term industry secondment," making it easier to implement and providing support. Because the rotation period is short, teachers' income and work at school are not significantly affected. Businesses are willing to accept them because it only lasts 5-30 days, minimising disruption to production. The government/businesses/schools share the costs, thus making implementation highly feasible. In the US: vocational training teachers are required to rotate to partner businesses for 40–80 hours/year (only 5–10 working days) (Perkins V mandate). Businesses pay salaries during the secondment period; schools are funded by the Perkins Fund; schedules are flexible (can be broken down into smaller parts). Results: 78–85% of CTE teachers complete the program annually → a 30% reduction in teacher turnover and a 15–20% increase in student employment (Advance CTE, 2023; RAND, 2023). In Australia, periodic rotation to businesses is mandatory, with a regulation of 4–6 weeks/year (20–30 days) at the business (BHP, Siemens, Qantas…). Businesses pay salaries + travel expenses; the Industry Currency Fund provides 100% funding. This is counted towards mandatory CPD hours. Results: 94% of trainers completed the training, thus the lecture content is updated annually (TAFE Directors Australia, 2023). Lessons for Vietnam include: Flexing certification (an alternative path for business professionals), combining short-term secondments (20-30 days/year) for easier implementation, and overcoming the less than 10% periodic turnover to current businesses (Ministry of Labour, Invalids and Social Affairs, 2023). This should be applied to the Vocational Education and Training Development Strategy 2021-2030 to increase feasibility and support smart agriculture and industry.

PROPOSING STRATEGIC SOLUTIONS FOR DEVELOPING PRACTICAL TEACHERS IN VOCATIONAL EDUCATION AND TRAINING (VET) BASED ON A COMPETENCY-BASED APPROACH IN VIETNAM

Solution 1: Establishing Strict National Standards and Dual Rotation to Ensure High Practicality (Lessons from Germany)

- Objective: The objective of this solution is to finalize the national standard framework for practical teachers in vocational education and training (VET), aiming to increase the percentage of teachers meeting dual standards (pedagogical and advanced vocational skills) from the current 38-42% to at least 70% by 2030, while strengthening regular rotation to reduce the gap between theory and practice and increase the employment rate of graduates to 80-90%. The solution aims to integrate the German Duales System model, where AEVO certification and rotations of ≥ 4 weeks/year have helped trainee employment rates exceed 90% and youth unemployment rates remain below 7% (BIBB, 2024). This will support Vietnam's Vocational Education and Training Development Strategy 2021-2030, promoting digital capabilities and the application of Industry 4.0 technologies in smart agriculture and industry.
- Content: The solution focuses on two main areas: (i) Building a rigorous national standard based on Germany's AEVO, including a requirement for a high-level vocational qualification (equivalent to Meisterbrief), 120 hours of specialised pedagogical training, and a theoretical-practical examination, valid for 5 years and renewable via CPD (Springer, 2023). The dual standard will be integrated into the National Vocational Competency Framework (NVQF), prioritising fields such as IoT, automation, and smart agriculture. (ii) Implementing a periodic dual rotation of ≥4 weeks/year at partner enterprises, focusing on updating practical skills such as VR/AR and sustainable production, helping to increase the quality of lectures by 25% as in Germany (BIBB, 2024). This will address the current limitation where 50% of teachers teaching integrated subjects lack practical experience (Nguyễn, H. L, 2023).
- Implementation Method: The solution will be implemented in three phases: (i) Preparation Phase (2026): Amend the Vocational Education and Training Law (2014) and Circular 04/2021/TT-BLDTBXH to stipulate mandatory dual standards, cooperate with BIBB Germany via ODA to design teacher training programs; (ii) Pilot Phase (2026-2027): Apply at 10 pilot colleges with a rotation support fund (20-30 million VND/teacher/year) from the state budget and enterprises. Teachers participating in rotation will update their teaching programs and be evaluated through KPIs (completion rate > 80%). (iii) Expansion Phase (2028-2030): Implement nationwide, monitor through the national LMS system to track the validity of certificates and rotation results. Cooperate with enterprises (VinGroup, Viettel) to build a partner network, similar to Siemens/Bosch in Germany. - Guarantee Conditions: To ensure effectiveness, the following are needed: (i) Priority state budget allocation (5-10% of GDP for vocational education and training), combined with ODA funds from Germany (GIZ) for initial training; (ii) Inter-ministerial coordination mechanism (Ministry of Education and Training, Ministry of Science and Technology) to standardize the National Qualifications Framework (NQF) and penalties for violations (administrative fines if standards are not met); (iii) Training of management staff through exchange programs with BIBB, ensuring an implementation rate of > 95% as in Germany; (iv) Annual periodic evaluation through surveys to make adjustments, avoiding the current situation where old certificates are not recognized (Tổng cục Giáo dục nghề nghiệp, 2023). With these conditions, the solution will raise the national standard score from 4 to 8-9, contributing to reducing youth unemployment and supporting the green economy.

Solution 2: Strengthening cooperation with businesses and building a large-scale digital platform (Lessons from Singapore and China)

- Objective: The goal is to build a close-knit business cooperation ecosystem and a national digital platform to increase the rate of digital training for practical teachers from 15-18% to 80% by 2030, while increasing cooperation with businesses to raise the employment rate of vocational education and training (VET) students to 90%. Learning from Singapore (Industry Attachment 6-12 weeks/year, raising student employment rate to 90-92%) and China (Double-Qualified with rotation ≥ 2 months/year, > 97% employment), the solution will support Decision 2222/QD-TTg on digital transformation of VET, promoting AI and IoT skills in smart agriculture and industry (ITE, 2023; MOE China, 2024).
- Content: The solution includes: (i) Developing a business cooperation model such as "Earn & Learn" (Singapore) or "1+1+1" (China), requiring businesses to participate in program design and receive training rotation, with tax incentives to overcome the current lack of coordination (Vu & Nguyen, 2023); (ii) Building a national digitalization platform (LMS similar to Canvas LMS Singapore or National Smart Education Platform China), providing > 500 free micro-courses on Industry 4.0, requiring ≥ 60 hours/year of digital CPD. Content focuses on updating lectures (increasing by 30% like Singapore) and digital skills for smart agriculture (MOE China, 2025; SSG, 2025).
- Implementation method: Three-stage roadmap: (i) Preparation stage (2026): Amend the Vocational Education and Training Law to integrate mandatory business cooperation, in cooperation with SSG. (i) Singapore and MOE China collaborate with ASEAN+ to design the LMS; (ii) Pilot phase (2026-2027): Implementation in 20 schools, with a rotation program of ≥ 2 months/year at large enterprises (Chinese-style Huawei), with funding support of 500-1,000 SGD/teacher/year (similar to Singapore). Teachers update the curriculum via the LMS, assessed through a CPD completion rate of > 85%; (iii) Expansion phase (2028-2030): Nationwide platform integration, integration of AI for automated assessment, and collaboration with enterprises through a network (VinGroup, Viettel) to receive 50% of teachers rotated annually.
- Conditions for ensuring success: Requires: (i) Budget from the National Digital Transformation Fund (initial 5 billion VND), combined with ODA from Singapore/China; (ii) Inter-sectoral coordination mechanism (Ministry of Education and Training, Ministry of Science, Technology and Digital Transformation, enterprises), with sanctions (penalties if (iii) Training LMS management technicians through international exchange programs. (iv) Monitoring through quarterly reports (CPD completion rate), adjusting based on survey feedback to avoid the current weak infrastructure (General Department of Vocational Education and Training, 2023). With these conditions, the solution will raise the digitalization criterion score from 3 to 8, supporting the digital economy.

Solution 3: Increasing the intensity of Continuous Professional Development (CPD) to adapt to Industry 4.0 (Lessons from Japan)

- Objective: The goal of this solution is to increase the intensity of continuous professional development (CPD) for practical training teachers from encouragement to mandatory ≥ 100 hours/year, aiming to shorten trainee training time by 20-25% and increase employment rate to 90% by 2030. Learning from Japan (CPD ≥ 240 hours/year through JAVADA, achieving 99% completion rate, employment rate nearly 100%), this solution will address low remuneration and lack of high-level vocational skills, supporting the 2021-2030 Strategy and the application of Industry 4.0 in agriculture and industry (JILPT, 2023; MEXT, 2025).
- Content: Focused solutions: (i) Elevate the mandatory CPD framework with content on kaizen, 5S, IoT, and Society 5.0 (like Japan), integrating ≥ 5 years of business experience into recruitment to attract experts; (ii) Build a national LMS platform (similar to JAVADA/FANUC), providing courses on robot programming, CAD/CAM, and AI, helping teachers update practical skills (Do & Do, 2022). Content will prioritize the smart agriculture

sector, addressing the issue of 28-32% of teachers lacking practical experience.

- Implementation methods: Roadmap: (i) Preparation phase (2026): Revise the Vocational Education and Training Strategy to mandate a high level of CPD, cooperate with MEXT Japan through JICA to design the program; (ii) Pilot phase (2026-2027): Implementation at 5 Japanese-style vocational schools (senmon gakko), with a 20-30% salary increase fund for teachers who complete the CPD. Teachers participate in online courses and are evaluated through practical tests; (iii) Expansion phase (2028-2030): Nationwide, integrating the CPD into the performance evaluation system, with business cooperation (Toyota Vietnam) to provide practical content.
- Guarantee conditions: Requirements: (i) ODA budget from Japan (5-7 billion VND), combined with the national CPD fund; (ii) Incentive mechanism (performance bonus for completing CPD > 90%); (iii) Management training through an exchange program with JAVADA; (iv) Regular monitoring via LMS (completion rate > 95%), adjustments based on surveys to avoid the current skills gap (General Department of Vocational Education and Training, 2024). Under these conditions, the solution would raise the CPD score from 3 to 9, boosting the digital economy.

Solution 4: Flexible Certification and Short-Term Secondment to Increase Enforcement (Lessons from the US and Australia)

- Objective: The goal of this solution is to make certification flexible to attract business professionals, increase the turnover rate from < 10% to > 70% by 2030, reduce teacher turnover by 30%, and increase the employment rate of trainees to 85%. Learning from the US (Flexible State CTE License, 40-80 hour secondment/year) and Australia (TAE40122 with RPL, 4-6 week secondment/year), the solution will address weak enforcement and support the digital transformation of vocational education and training (ASQA, 2023; RAND, 2023).
- Content: The solution includes: (i) Flexible certification with alternative pathways (≥ 3-5 years of experience + 120 hours of training), RPL recognition for business professionals (like the US Alternative Certification); (ii) Mandatory short-term secondment of 20-30 days/year (broken down), focusing on green skills and Industry 4.0 at enterprises (Australian-style BHP), digital CPD ≥ 40 hours/year via NCCER/VET Moodle (Ministry of Labour, Invalids and Social Affairs, 2023).
- Implementation method: Roadmap: (i) Preparation phase (2026): Amend vocational education regulations to integrate RPL and short-term secondment, cooperate with RAND/ASQA through USAID; (ii) Pilot phase (2026-2027): Apply in 15 schools, fund support 50-70% of costs (enterprises pay salaries). Teachers participate in secondment, update lectures; (iii) Expansion phase (2028-2030): Nationwide, integrated into CPD, with a network of enterprises (American-style General Electric).
- Guarantee Conditions: Required: (i) Perkins-style fund (5 billion VND), sharing state-enterprise costs; (ii) Penalties for violations (fines for failure to complete secondment); (iii) Management training through Australian-American programs; (iv) Monitoring through KPI reports (completion rate > 70%), adjustments based on surveys to avoid current limitations (Tổng cục Giáo dục nghề nghiệp, 2023). With these conditions, the solution will raise the implementation score from 2 to 8, supporting the green economy.

CONCLUSION

The study systematised the theoretical basis for developing a team of practical teachers in vocational education according to the competency-based approach (Cedefop, 2016; Mulder, 2014) and compared the current situation in Vietnam with six leading countries in the world (USA, Germany, Singapore, China, Japan, Australia). The results show that Vietnam only achieved an average of 3.0/10 points – the lowest in the group – due to the rate of dual

standard achievement below 50%, practical experience in enterprises only 28–32%, periodic rotation below 10%, and digital training only reaching 15–18% (Nguyễn, H. L, 2023). Meanwhile, advanced countries simultaneously implement strict four factors: mandatory dual certification standards, minimum 2–5 years of industry experience, periodic rotation of 20–90 days/year, and 35–240 hours/year of digital CPD, resulting in trainee employment rates of 85–99.5% (BIBB, 2024; MEXT, 2025; MOE China, 2025; SSG, 2025). From comparative analysis, four international lessons learned and four proposed strategic solutions clearly indicate a feasible path for Vietnam to raise its overall score to 7+ in the next decade: (i) building dual standards and dual rotation like Germany; (ii) deep enterprise cooperation and a national digitalization platform like Singapore–China; (iii) high-intensity CPD like Japan; (iv) flexible certification and short-term secondment like the US–Australia. The synchronized implementation of these solutions, with pilot programs starting in 2026 and strict monitoring, will help Vietnam not only achieve the goals of the Vocational Education and Training Development Strategy for the period 2021–2030, with a vision to 2045 (Prime Minister, 2021), but also contribute to building a high-quality workforce to serve agriculture and smart industries, and sustainable international integration.

REFERENCES

Advance CTE. (2023). *Teacher externships: Impact on student employment outcomes*. https://careertech.org/resource/teacher-externships

American Skills Quality Authority (ASQA). (2023). *Standards for Registered Training Organisations (RTOs) 2023*. https://www.asqa.gov.au/standards

ASQA. (2025). *VET workforce data report 2025*. Commonwealth of Australia.

Baumert, J., & Kunter, M. (2011). The COACTIV model of teachers' professional competence. In *Cognitive activation in the mathematics classroom and professional competence of teachers* (pp. 25–48). Springer. https://doi.org/10.1007/978-1-4614-5149-5_2

BIBB – Federal Institute for Vocational Education and Training. (2024). *Data report 2024: Vocational education and training in Germany*. BIBB.

BIBB – Federal Institute for Vocational Education and Training. (2025). *VET 4.0 – Digitalisation in dual VET: Implementation status 2025*. BIBB.

BLS – Bureau of Labor Statistics. (2024). *Occupational outlook handbook: Career and technical education teachers*. U.S. Department of Labor. https://www.bls.gov/ooh/education/cte-teachers

California Commission on Teacher Credentialing. (2023). *CTE credential requirements*. https://www.ctc.ca.gov/cte-requirements

Chính phủ Việt Nam. (2021). *Chiến lược phát triển giáo dục nghề nghiệp giai đoạn 2021–2030, tầm nhìn 2045 (Quyết định 2239/QĐ-TTg)*. https://vanban.chinhphu.vn/default.aspx?pageid=27160&docid=204883

Đỗ, M. C., & Đỗ, T. L. (2022). Thực trạng đội ngũ giảng viên dạy thực hành trong các trường cao đẳng nghề Việt Nam. *Tạp chí Giáo dục nghề nghiệp*(6), 15–23.

Education Commission of the States. (2022). *50-State comparison: CTE teacher certification*. https://www.ecs.org/

ITE – Institute of Technical Education. (2023). *Industry attachment programme annual report 2023*. Singapore.

JILPT – Japan Institute for Labour Policy and Training. (2023). *Vocational education and employment outcomes in Japan*. Tokyo.

MEXT – Ministry of Education, Culture, Sports, Science and Technology. (2024). *White paper on vocational education and training 2024*. Tokyo.

MEXT & JAVADA. (2025). *Digital transformation in senmon gakko and kosen: CPD statistics 2025*. Tokyo.

MOE China. (2024). *Annual report on double-qualified teachers in TVET 2024*. Beijing.

MOE China. (2025). *National smart education platform: Usage statistics 2025*. Beijing.

Mulder, M. (2014). Conceptions of professional competence. In S. Billett, C. Harteis, & H. Gruber (Eds.), *International handbook of research in professional and practice-based learning* (pp. 107–137). Springer. https://doi.org/10.1007/978-94-017-8902-8_5

National Center for Education Statistics (NCES). (2022). *Career and technical education in public high schools: 2021–22*. Washington, DC.

National Centre for Vocational Education Research (NCVER). (2024). *VET student outcomes 2024*. Australian Government.

Nguyễn, H. L. (2023) . Đào tạo nguồn nhân lực chất lượng cao trong hệ thống giáo dục nghề nghiệp Việt Nam. *Tạp chí Giáo dục, 23*(10), 45–53.

NPC – National People's Congress. (2022). *Luật Giáo dục nghề nghiệp Trung Quốc (sửa đổi)*. Beijing.

RAND Corporation. (2023). *The impact of teacher externships on retention and curriculum relevance*. Santa Monica, CA.

ScienceDirect. (2024). *Immersive VR for vocational education: Knowledge gains and motivational effects*. https://www.sciencedirect.com

SEA-VET. (2024). *Singapore VET profile*. https://sea-vet.net

SkillsFuture Singapore (SSG). (2024). *SkillsFuture annual reports 2024*. Singapore.

SkillsFuture Singapore (SSG). (2025). *SkillsFuture annual reports 2025*. Singapore.

Springer. (2023). *Teacher rotation in dual VET: Impacts on pedagogical quality*. https://link.springer.com/article/10.1007/s12186-023-09321-4

TAFE Directors Australia. (2023). *Industry secondment program evaluation report*. Sydney.

Tổng cục Giáo dục nghề nghiệp. (2023). *Báo cáo đánh giá chất lượng đội ngũ nhà giáo giáo dục nghề nghiệp năm 2023*. Hà Nội.

Training.gov.au. (2024). *TAE40122 Certificate IV in Training and Assessment*. https://training.gov.au/

U.S. Department of Education. (2023). *Perkins V overview*. Washington, DC.

Vũ, T. V., & Nguyễn, Q. T. (2023). Chuyển đổi số trong các cơ sở giáo dục nghề nghiệp tại Việt Nam: Thực trạng và giải pháp. *Tạp chí Kinh tế và Dự báo*(17), 1–12.

World Bank. (2022). *Vietnam VET sector assessment: Teacher quality and industry engagement*. Washington, DC.

World Bank. (2023). *China vocational education development report*. https://www.worldbank.org/en/country/china/publication/vocational-education-report

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역량 기반 접근에 따른 직업교육기관 실습교사 인력 개발: 베트남을 위한 문헌 고찰 및 전략적 방안

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본 연구는 역량 기반 접근법(Mulder, 2014)을 사용하여 베트남의 직업교육훈련(VET) 교사 개발 현황을 4가지 기준(필수 국가 표준, 실무 경험, 주기적 순환, 지속적인 디지털 교육)에 따라 미국, 독일, 싱가포르, 중국, 일본, 호주 등 6개 선도 국가와 비교 분석하였다. 연구 결과, 베트남은 10점 만점에 3.0점(최저점)을 기록했으며, 이중 표준 달성률은 50% 미만, 실무 경험은 28~32%, 순환 근무는 10% 미만, 디지털 교육은 15~18%에 그쳤다(베트남 직업교육훈련총국, 2023; Nguyen, 2023). 반면, 6개 선도 국가는 7.75~9.5점을 획득하고, 학생 취업률은 85~99.5%에 달했는데, 이는 위의 4가지 요소를 조화롭게 시행한 결과이다. 본 연구는 다음과 같은 4가지 전략적 해결책을 제시한다: (1) 독일식 이중 표준 + 이중 순환; (2) 싱가포르-중국과 같은 심층적인 기업 협력 + 국가 디지털화 플랫폼; (3) 일본과 같은 고강도 CPD; (4) 미국-호주와 같은 유연한 인증 + 단기 파견. 2026년부터 시행하면 베트남의 점수를 7점 이상으로 끌어올려 2021-2030 직업교육훈련개발전략의 목표를 달성하고 스마트 농업 및 산업을 지원하는 데 도움이 될 것입니다.

주제어: 실무 중심 교사, 직업 교육, 역량 기반 접근법, 국제 경험, 이중 기준 – 순환 근무 – 디지털화된 전문성 개발

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